

# Project Executive Summary Report

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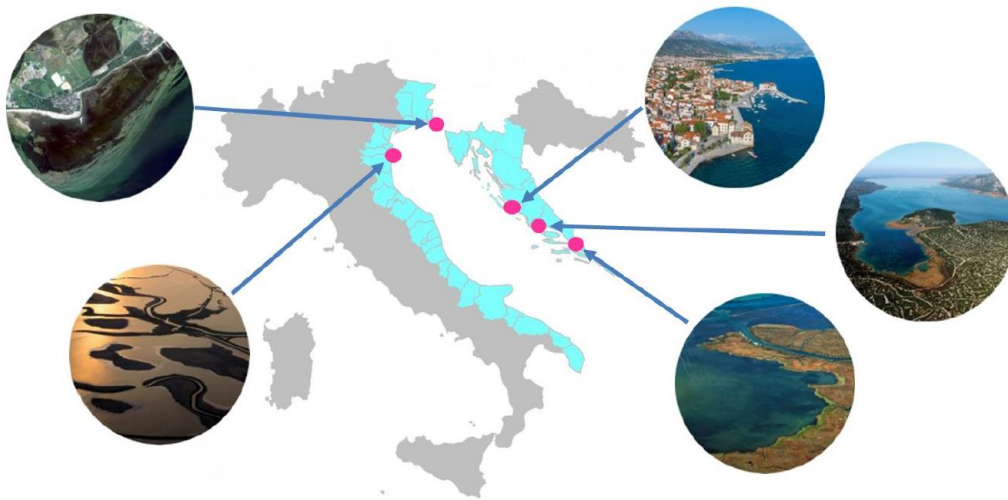
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## Introduction

The Executive summary Report presents the results of the five pilot sites within the CHANGE WE CARE project which were implemented to develop specific instruments and measures for the Pilot Sites, addressing local environmental and socio-economic priorities. This Report contains the methodology, activities and results with a particular emphasis on the project results' transferability to similar contexts.

Adaptation/management Plans are issued with the contribution of local stakeholders, following the principles of the ICZM and MSP, in order to increase the system resilience to climate change impacts. In each Pilot Site adaptive methodology studies is carried out addressing the key socioeconomic aspects of anthropic activities and defining the most important ecosystem services.

The Pilot Sites are: Neretva River, Jadro River and Kaštela bay, Nature Park Vransko Lake (Croatia), Banco Mula di Muggia and Po River Delta (Italy).



## Neretva River Pilot Site



### **Brief summary**

The area of the Neretva Delta ecological network belongs to the Mediterranean region, which is recognized as a climatic 'hot spot' and has already reached an average increase of 1.5°C with particularly pronounced effects of climate change. Neretva Delta is one of the most valuable wetlands on the eastern Adriatic coast and one of the rare remaining wetlands in the European Mediterranean. For this reason, the development of the Adaptation plan, which defines the strategy for adaptation to climate change, is extremely important for the future of the Neretva Delta.

### **Methodology**

A detailed analysis of the existing literature, as well as an analysis of completed research is the first step in developing an Adaptation Plan. Workshop was chosen as a basic participatory technique to involve as many stakeholders as possible in the development of the adaptation plan. The design phase included the choice of an ideal participatory approach method, the definition of workshop programmes, as well as the identification of potential stakeholders. During the design phase, the way in which the workshop parts of the participatory approach are implemented has been designed in detail. The implementation phase followed the design phase, with three participatory workshops, each of which has a specific objective.

### **Activities**

The key activities are the organization of three participatory workshops and the implementation of four research projects: Research on physico-chemical factors as a potential drivers of climate change in the ecological network River Neretva Delta (HR5000031), Mapping of target fish species in the area of the ecological network Neretva Delta (HR5000031), Fishery management study of ecological network Neretva Delta (HR5000031) and Socio-economic analysis of the fisheries sector in the River Neretva delta (Eastern Adriatic coast, Croatia).

The study 'Research on physico-chemical factors as a potential drivers of climate change in the ecological network River Neretva Delta (HR5000031)' presents the results of research on physico-chemical factors as potential climate change drivers in the protected ecological network River Neretva Delta (HR5000031),

in the period July 2020-June 2021, as a basis for comparison with historically available data, and determining the impact of physico-chemical changes, mainly temperatures and salinity, on the recent status of the native ecosystems. The main goal of 'Mapping of target fish species in the area of the ecological network Neretva Delta (HR5000031)' was to map fourteen target fish species that are key species of protection in the mentioned ecological network and to propose new levels of endangerment, main threats and necessary measures to improve the status of target species. Fishery management study of the ecological network Neretva Delta (HR5000031) was made with the aim of evaluating the development potential of freshwater sport fishing in the ecological network, from the aspect of economic benefits for the future fishing licence holder and restrictions arising from ecological network protection principles. The study on socio-economic analysis of the fisheries sector in the River Neretva delta examines the position of local fishery in relation to other economic activities over the past three hundred years and provide an overview of this activity today and its perspectives in terms of expected climate change.

The first workshop 'Effects of climate change on the Neretva delta' took place at the Metković City Library on 30 March 2021. During the first workshop, the workshop section included discussion on the key challenges of this area. An important part of the first workshop was the discussion on measures and the definition of the vision of space in the context of climate change by stakeholders. The second workshop 'Adaptation measures to different climatic scenarios for the delta Neretva' Was held at the City Library in Opuzen on 30 August 2021. During the second workshop, participants discussed potential objectives, measures and activities in adapting to climate change. The third workshop 'Action Plan for adaptation to expected climate change in the Neretva delta' was held on 20 September 2021 at the Public Open University in the city of Ploče. During the last workshop, stakeholders actively updated the existing action plan for adapting to climate change. The workshops brought together a large number of local stakeholders from civil, private and public sector. The diversity of stakeholders has enabled a high-quality discussion on the key challenges of the area. The results obtained contributed to improving the quality of the preliminary document and the Action Plan for adaptation to climate change.

### **Main results**

The conclusions of the workshops and research will help to achieve results. According to the results of the first workshop, the vision of the ecological network of the Neretva Delta in adapting to climate change is: 'Symbiosis of river and people' Symbiosis in the narrow sense (or mutualism) means the interactivity of two organisms from which both organisms benefit. The vision emphasizes the importance of realizing the harmonious coexistence of two 'organisms' - the Neretva River and the people who live near it. The vision of adaptation to climate change is elaborated through a hierarchy of goals and measures.

In line with the vision, the following five goals have been defined:

1. Preserved and adaptable ecosystem,
2. Sustainable management of aquatic ecosystems,
3. Improving the functionality of important ecosystems,
4. Sustainable and resistant economy and
5. Aware and proactive population.

### **Transferability**

The results of this project, in particular the Action Plan for Climate Change Adaptation, will serve as the basic strategic document for climate change adaptation of all local and regional self-government units in the Neretva Delta. Climate change is a great threat to the future survival of this area. All results represent key contributions to improving climate change monitoring, as well as to improving adaptation to future scenarios.

## Jadro River Pilot Site



### **ADAPTATION PLAN FOR JADRO RIVER**

#### **Methodology**

Adaptation Plan For Jadro River corresponds to the Deliverable 5.3.2 indicated in the Application Form. The goal of the Plan is to transfer a common knowledge base on the current and expected dynamics of coastal systems in the area of Jadro river.

Starting with the “preliminary document” on the knowledge, threats and opportunities framework, previously prepared for the start of the participatory process, the adaptation plan was developed taking into account the results of work packages 3 and 4 and the participatory process itself, including joint vision, objectives, measures / actions / interventions, possible resources / funding and roles and responsibilities for its implementation after the completion of the Change We Care project.

#### **Activities**

The Plan development is carried out through participatory processes (see delivery product 5.3.1) to ensure that all information is gathered, a joint decision is reached and stakeholder consensus is reached so that the plan is effectively implemented through cooperation between all stakeholders and decision maker.

Participatory workshops for the Jadro River and Kaštela Bay Pilot Area covered three topics, as defined by the Project: Climate change impacts, Scenarios and adaptation measures and Planning options. Due to the covid-19 health crisis and imposed measures that limit organisation of workshops, the Working group decided to organise two live workshops covering all three topics. The goal was to ensure active participation of the attendants and discussion in live.

During the workshops discussion, it turned out that this was a rare opportunity for all stakeholders to express their views and problems. Particularly in the case of the management of the Jadro river basin, where an integral approach is required, and the basin is divided between several administrative units and several sectors. That complicates the management of both the strategic and daily operational activities. As an illustration, one bank of the river is in one municipality and the other in another municipality.

In addition to two participatory workshops, the process of Plan development included participation in project training, presentations on project conferences and info days.

## **Results**

The Plan consists of 7 chapters of which the main ones describe the current state in the pilot area, knowledge gathered during participatory process, the vision for the pilot area and derived goals, measures and activities. The document ends with indicators for monitoring and examples of potential projects. The Plan focuses on two main issues: water management and urban development and thus proposes an integrated approach for the management of natural-urban river basin.

This Plan contains an analysis of the state of the Jadro River Basin in the light of future climate change and proposes a series of measures and activities aimed at maintaining and improving the quality of life in the area. As a key precondition for achieving this goal, it is necessary to maintain and improve the state of the natural environment, especially water as a key natural resource for the wider area. So far, the main drivers of change in this area have been human activities primarily through intensive urbanization, the result of the expansion of the urban agglomeration of Split. The river Jadro in the lower part of the stream as well



as parts of the tributaries have been turned into urban canals and have the function of water drainage, and they have lost their natural functions. Today, we are already feeling the effects of climate change through higher precipitation in shorter periods and longer periods of drought and high temperatures. Thus, we have witnessed fires and torrential floods in recent years, which will be more frequent according to current climate change scenarios. Analyzes have shown that the quantitative regime of water is most influenced by climate and climate change, while the regime of water quality is most influenced by man.

In the area of the topographic basin there are settlements Solin and Klis whose population is growing as well as the number of buildings and urban areas are increasing. Urban development is not accompanied by the construction of wastewater and rainwater drainage systems with treatment, the waste disposal system is underdeveloped and the waters are under constant threat of pollution. This also applies to the area of the total hydrological basin. Including the planned zones, the ratio of natural and artificial areas in the topographic basin is 62% of natural versus 38% of artificial areas. Such a large share of artificial surfaces in the topographic basin leads to the need for integrated management of the river basin and urban areas, and the application of urban design sensitive to water, green city and smart and sustainable development is proposed.

### **Project results' transferability to similar contexts**

In order to transfer the knowledge from this Plan into development plans and documents, the first planned step is to present the Plan to the local government to the Mayor and City Council of Solin and the Mayor and Municipal Council of Klis. In accordance with the stakeholder proposal, the continuation of activities is planned during the presentation of the plan. Thus, the first meeting is planned for February 2022 in order to take and coordinate the steps needed to implement the proposed measures of this Plan. There are several calls for projects with the aim of "green transition" and the idea is to apply for projects together and thus achieve a synergy of forces and an integrated approach to management.

Most of the Croatian coastal cities has storm water drainage system undeveloped, has hilly area behind and green infrastructure is potential solution for future. Therefore, any experience in analyzing the needs for green infrastructure, planning and preferably implementing is highly transferable for any Croatian coastal city.

## **Annex to the Adaptation Plan**

### **COASTAL INFRASTRUCTURE CADASTRE**

#### **Methodology**

This document is in addition to the Adaptation Plan for the pilot area of the river Jadro and deals in detail with the coastal area of the Kastela Bay. The shores of the bay in the area of the Kaštela are low and are already subject to coastal flooding. Here are the most valuable resources that include historic cores and many historic buildings, coastal promenades, marinas and harbors, beaches, and many infrastructure. The key measure of adaptation of these areas to climate change is protection against coastal flooding, which is caused by cumulative pressure coming from the sea (storms) and from the land (torrential floods).

#### **Activities**

The task covered the coastal area of the City of Kaštela. Digital data on the terrain model, coast and facilities were taken from the Coastal Zone Management Plan of the City of Kaštela and were further expanded based on satellite data from 2021 and field data collection.

#### **Results**

Future activities in the development of the coastal area of the City of Kaštela require detailed information on the narrow coastal area. Therefore, this document gives an overview of the entire coast with lengths, altitudes, type (built, natural) and purpose of the coast. All buildings endangered by coastal flooding are listed, and at the end, a proposal for standard solutions for protection against coastal flooding is given. The result consists of a report, GIS database and catalogues of maps.

#### **Project results' transferability to similar contexts**

In order to transfer the knowledge from this document into development plans and documents, the first planned step is to present the Plan to the local government to the Mayor and City Council of Solin and the Mayor and Municipal Council of Klis.

## Nature Park Vransko Lake Pilot Site



**Methodology:** A common methodology to develop planning of adaptation measures to climate change in the Programme coastal areas. Nature park Vransko lake defined interest on processes focusing on a broad range of adaptation to climate change problems (temperature rise, sealevel rise, precipitation level low) or to a narrower focus on particular challenges (salt water intrusion and nutrient discharge, eutrophication). It allowed to

know better the state-of-the-art, and was related to surveying, organizing, gathering data and info on the physical, geological, ecological status of the Pilot Site.

With the intention of achieving effective joint actions and adaptation measures were planned. These were developed in cooperation with competent authorities and were discussed with identified stakeholders. In order to optimize the common framework, the engagement of participants relies on a broad participation of stakeholders.

**Activities:** The emphasis in the activities was on the systematic collection of information on knowledge of climatic processes that trigger physical, biogeochemical, morphological and biological changes. In addition to the reports that analyse the data collected so far on the impact of climate change on the lake and with the aim of future accurate monitoring of changes, specialized equipment for automated monitoring of water and air quality parameters such as salinity, oxygen, nitrate and other physicochemical parameters.

**Results:** Transfer the latest knowledge on climate change to the most beneficial policy makers: planners, conservation authorities, local and regional authorities, assessing adaptation to climate change, raising citizens' awareness of the impacts of climate change and planning possible adaptation measures. Climate change Adaptation plan has resulted from communication with a number of diverse stakeholders and the local community in the process of involving them through several previous workshops, surveys and interviews. Emphasis in the adaptation plan was placed on methods of returning carbon back to the soil. The plan elaborates in detail the possibilities of implementing a pilot measure for carbon production in the area of the Vrana Lake Nature Park and its surroundings. The conceptual solution of regenerative agriculture to adapt to the effects of climate change in the Jasen area proposes the revitalization of

floodplain meadows and extensive livestock on the principle of rotational grazing, planting flower strips and windbreaks, establishing plantations of tame asparagus and artichokes and short-range crops for wood chips.

**Transferability:** The Project outputs consist of climate change Adaptation, Action and Monitoring Plans for the Pilot Site. Training activities have enabled technical and administrative operators to take full advantage of the data and protocols made available by the project in the direction outlined by the plans. Dissemination events and workshops have increased the stakeholders and community's awareness on CC impacts and on the existence of adaptation measures tailored on their needs. The established network for sharing data and procedures will maintain an efficient monitoring activity, allowing the continuous assessment of the Adaptation Plans outcomes in the face of the ongoing climate change impacts.

## Banco di Mula di Muggia Pilot Site



Knowledge, research and monitoring the status of Mediterranean coastal areas are some of the pillars of the Joint Action Plan of the “Bologna Charter 2012”.

The **methodology** used in pilot site test Mula di Muggia start from this statement to answer Climate Change adaptation needs.

The pilot site test is really sensitive to sea-level rise and storm patterns. Two contrasting elements, such as an area for marine tourism development and a Natura 2000 site, coexist in the same area. The **activities** were organized in complementary steps and the results are successful.

The gap in knowledge come to an end by the integration of different methodologies. Change We Care helped to understand the sediment dynamics in the pilot site test (Figure 1). Land subsidence and sea level rise were compared and short-term (Figure 2) and long term (Figure 3) coastal vulnerability scenario were defined: different flooding models for RCP scenarios were obtained by imposing the respective sea level rise values on the model.

Thanks to the historical analysis and more recent data collection, areas with varied morphosedimentary characteristics and with distinct tourist-recreational, ecological, and conservation values have been identified and mapped (Figure 4). The map emphasizes how coastal areas have been developed without

considering their inherent characteristics, in the absence of ICZM or coordinated coastline management guidelines.

The activation of a Participatory Processes at local level is an excellent way to identify and co-design options and solution to be developed in the future. The structure of the participatory process, organized in a public and a restricted phase accompanied by non-technical reports, have given excellent results, providing an orientation for future decisions (Figure 5).

To summarize the **results** of the Change We Care project: it is clear that “living with nature” is a solution driven by natural trends, as a fundamental guideline for a correct human use, thus forcing us to a responsible and sustainable development. This allows to limit possible impacts of definitive choices, as those following hard engineering philosophy. Possible options should be configuration regimes aimed at beach nourishment or morphological reshaping (Figure 6). The strategies for the future of the Grado area should focus on the monitoring and evolution of the sand bank area, on the adaptation of the infrastructures and use to the natural evolution and eventual implementation of light interventions that can adapt to natural evolution.

The philosophy of knowing in order to plan and design must become a habit. The experience of the Banco Mula di Muggia suggests the **transferability** of the decision-making process, starting from the integration of missing knowledge up to the use of innovative systems for scenario simulations. In this process close collaboration between public administrations and research centers is fundamental.

The cost / benefit ratio suggests that the structure of the participatory process should be transferred to many other cases.

## Po River Delta Pilot Site



### SACCA DI GORO PILOT SITE

#### Brief summary

The Po Delta represents the final sub-basin subtending the entire hydrographic basin of the Po River, and it develops as a flat region with an area of 472.55 km<sup>2</sup> (1.6 % of the total hydrographic basin). In this area, the Po River is divided into several branches: Po di Levante, Po di Maistra, Po di Pila, Po di Tolle, Po di Gnocca in the Veneto Region and Po di Goro, which is part of the Emilia-Romagna Region. This branche provide freshwaters inputs to the pilot site of Sacca of Goro

lagoon. The Sacca of Goro lagoon is a shallow-water lagoon in the Po Delta , with an average depth of approximately 1.5 m, which receives freshwater inputs also from the the Po di Volano, an artificial canal laying in the ancient bed of a former Po River branch. Most of the population works directly in the pilot site involved in fishery or in the satellite activities such as in transformation of fish products. However, despite the economic values, the area of Sacca di Goro suffers from low schooling rate and tourism is not adequately developed.

### **Methodology**

To involve as many stakeholders as possible in the development of actions to climate change adaptation a participatory process was planned. The participatory process in the Sacca di Goro is planned as 3 workshops, each of them included a plenary section and 4 parallel sections based on stakeholders' target (fisherman, tourist and economic operators, educational bodies and public bodies). The participatory process also included two phases of research and development by technical staff of the project in order to contrast/mitigate/solve the critical issues pointed out. A communication campaign and information actions were planned before and after each participatory workshop in order to involve stakeholders and disseminate project activities and results.

### **Activities**

During the first workshop different stakeholder groups were composed in order to point out the perceived criticalities, prioritizing them and identifying the main objectives to contrast or solve them. The tools proposed to facilitate this moment included the construction of descriptive posters. The poster asked clear questions in order to collect the chair's answers. During the second workshop the researchers and project technicians drafted some project ideas or best practices for each criticality outed in the target group. Therefore, the presentations and the discussion towards the choice of one or two really feasible practices took place. Impressions and ideas during the debate were collected to better develop these proposals according to the perceptions. The project proposals chosen during Workshop II and better elaborated by the partner technicians were presented to the stakeholder groups during the Workshop III. Posters and post-its will be used to collect suggestions. The way to facilitate the initial discussion on commitments will be inspired by the methodology of the European Awareness Scenario Workshop (EASW) and the elaboration of the EASW graph as a tool for visualizing the discussions. In fact, the discussion focused on identifying some aspects of the proposed project idea and the actions that they require.

### **Main results**

The participatory process involved 26 participants in the Workshop I, 28 participants and 10 member staff in the Workshop II and 31 participants and 11 member staff in the Workshop III. During the first Workshop,

the working groups identified critical issues in the Sacca di Goro and defined aims to solve them. During the second Workshop technicians of project staff showed to stakeholders the projects selected to answer to the critical issues emerging within the Workshop I. The third Workshop contributed to the awareness of the participants and stakeholders with a presentation dedicated to climate change scenarios with a focus on hydrodynamics and on some specific ecological targets of the Po Delta. Furthermore, the progress of the projects defined in the second workshop to solve the critical issues emerged in the first workshop was presented. The public bodies and competent agencies stakeholders group identified the 1) temporary sand duct, 2) diversor brush, 3) technical table projects, the Tour operators and other competent operators identified the fundraising to climate change project, the Educational institutions, and environmental associations group identified the 1) “Nice to meet you, Mrs Eel” educational project and the 2) testimonials for the awareness of citizens and network with associations and the Fishermen and shellfish farmers group identified the 1) establishment of the sacca observatory starting from a coordinated and interrelated database, 2) Bassunsin’s cut and 3) the contrast of the loss of wild seed project.

### **Transferability**

The results collected through the participatory process represent a key contribution from stakeholders to identifies real issues related to climate change and to identify local solutions promote by users themselves.

## **Conclusion**

The main output is a set of Adaptation/management Plans for the Pilot Sites, where the shared knowledge base on the present and expected dynamics of coastal systems in the cooperation area is conveyed. These Plans are made with the establishment of participatory processes, transparent and common decision practices among an heterogeneous community of stakeholders, scientists, policy makers, technical and administrative operators that provide a relevant legacy for coordinated management actions in a cross-border cooperation perspective.

Transfer of adaptation measures over different coastal typologies is enabled by the broad representativeness of the Pilot Sites, tackling a variety of most relevant issues as well as the transfer of the methodological achievements that will enable the replication and improvement of this approach, fostering cooperation at different administrative levels up to a cross-border scale.